

Standards for Petabyte Sized Archives

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MITRE

Three Activities

- **Support of the IEEE Storage Systems Standards Working Group**
 - This group has developed the *Reference Model for Open Storage Systems Interconnection*
 - Meetings every other month; next January 16-19 in Tucson
 - Current activity is developing APIs for the model modules
 - <http://www.arl.mil/IEEE/ssswg.html>
- **ISO/CCSDS Archiving Standards**
 - Relatively new activity, led by Don Sawyer of NSSDC
 - Current activity is to develop a Reference Model for the archiving activity
 - Next meeting is Dec. 19-20 at MITRE in Greenbelt
 - <http://www.gsfc.nasa.gov/nost/isoas/ws95us/ws.html>
- **New Activity to develop a tape format standard to allow for greater portability**

IEEE Meeting Rules

- **Meetings are public, open to anyone, although there may be a fee**
- **Participation is by individuals, not organizations**
- **Qualifications to vote are simply meeting attendance, at least in the case of the SSSWG**
- **Voting is by individuals**
- **Working Group may propose a standard for IEEE ballot**
- **Reference Model has the status of an approved draft**

Overview of the IEEE Reference Model

- **Purpose**
 - Provides a framework for the coordination of standards development, and common terminology for discussions
- **Consists of three pieces**
 - Storage Objects
 - Storage Services, provided by Storage Modules
 - Storage System Environment
- **Embodies key concepts in storage systems**
 - Transparency, separation of policy and mechanism, separation of control and data flows, third-party transfers, layered object naming, scalability, distribution

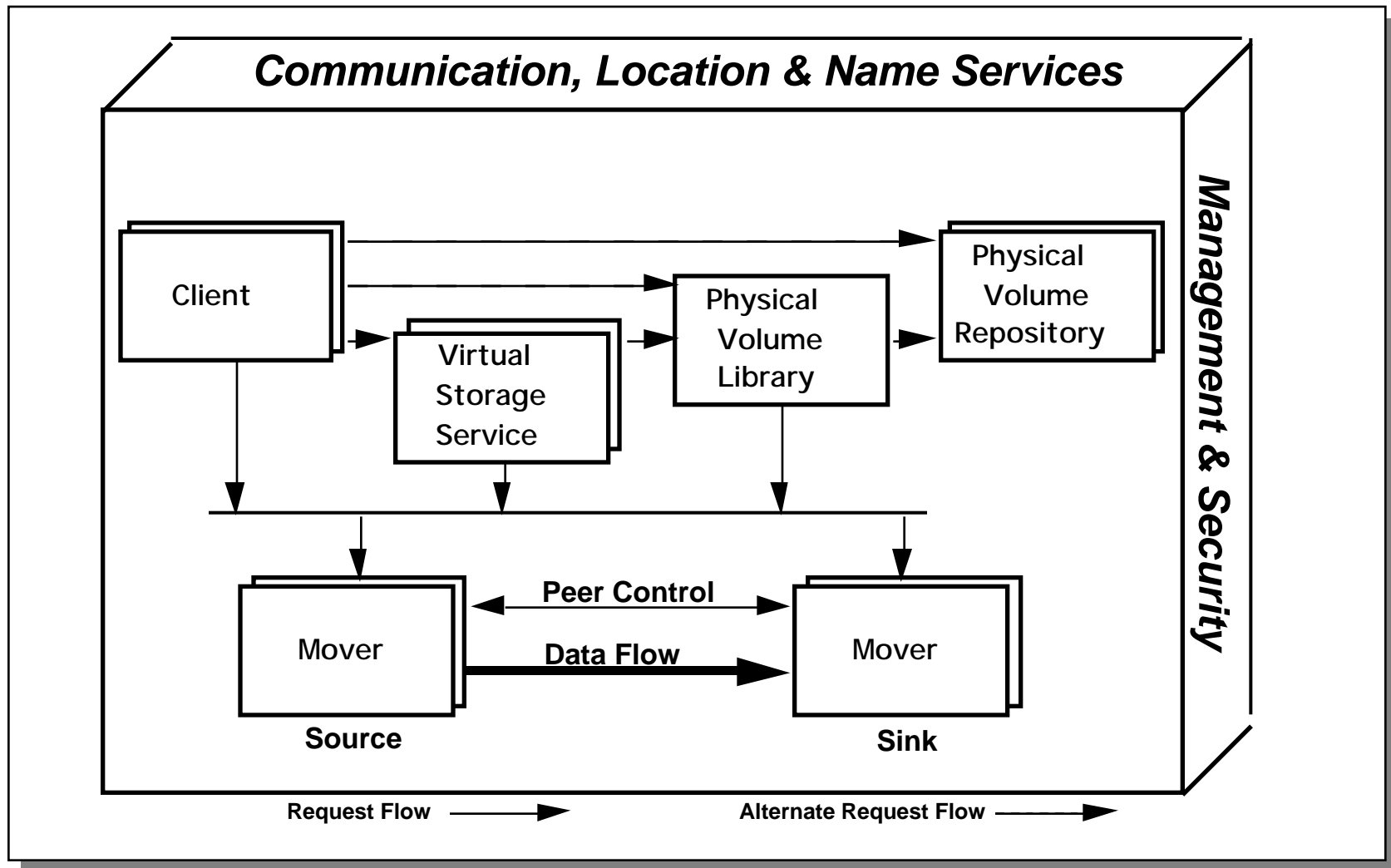
Definitions Relating to the IEEE Reference Model

- **Store:** An addressable storage space, either physical or virtual
 - Physical attributes defined by the media attributes
 - Virtual attributes defined by client request
- **Device:** A set of media access points (for data access) and a set of mount points (for physical access)
- **Physical Volume:** The recording medium accessible without intervening load operations
- **Cartridge:** A set of physical volumes or cartridges (note recursive definition)
- **Environment:** Storage-system-wide management, security, name services, location services, and communication services

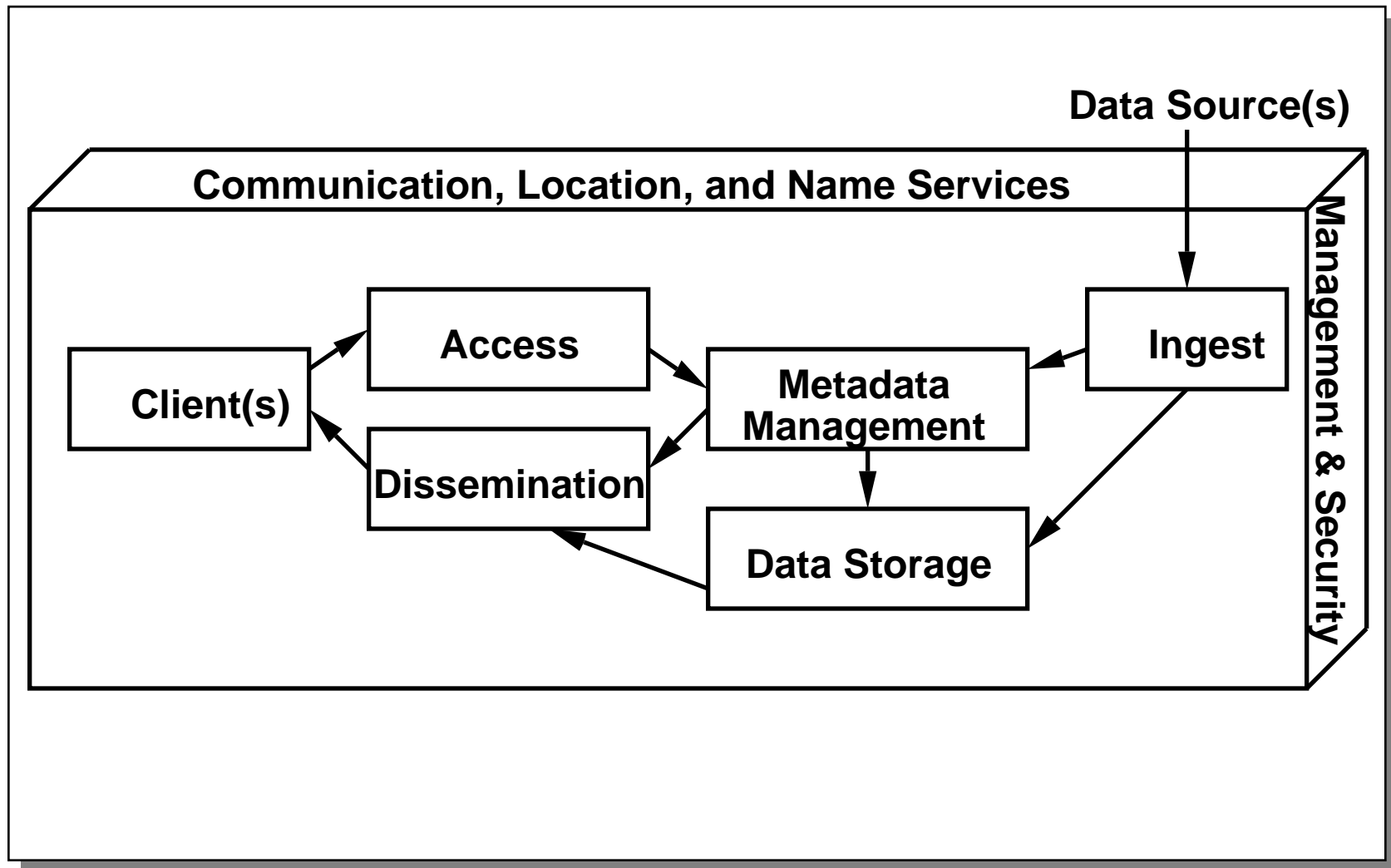
Reference Model Modules

- **Physical Volume Repository:** sees cartridges and drive mount points
 - *Mounts* cartridges to device mount points
- **Physical Volume Library:** performs the volume-to-cartridge mapping, and causes the Physical Volume Repository to mount cartridges
 - *Mounts* physical volumes
- **Virtual Storage Server:** creates stores and performs the store-to-volume mapping
 - *Creates* stores with certain characteristics
- **Mover:** model interface to devices to manage data transfer; in particular designed for high-speed data path
 - *Loads* media to media access points for data access

The Reference Model Diagram



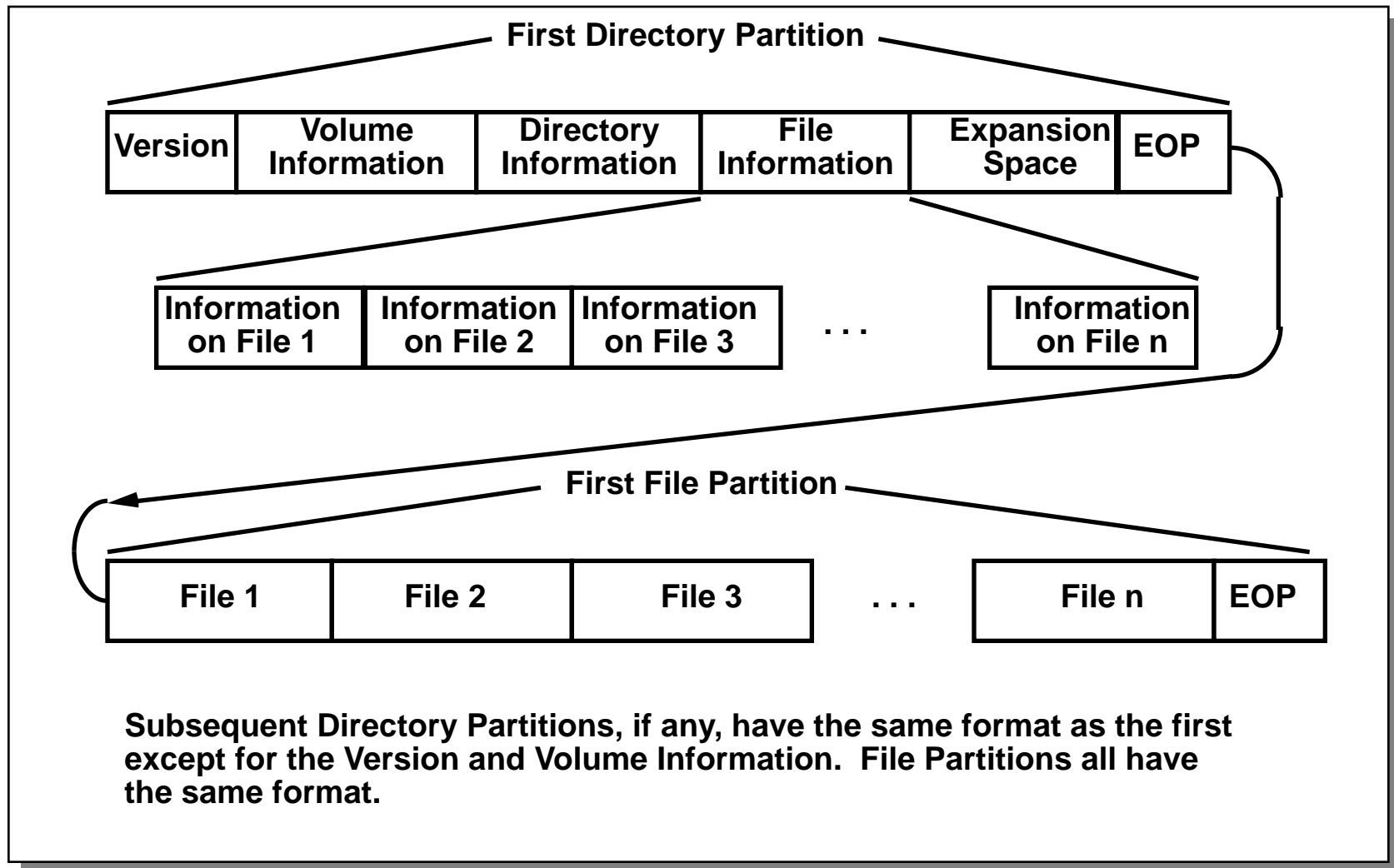
Archiving Reference Model



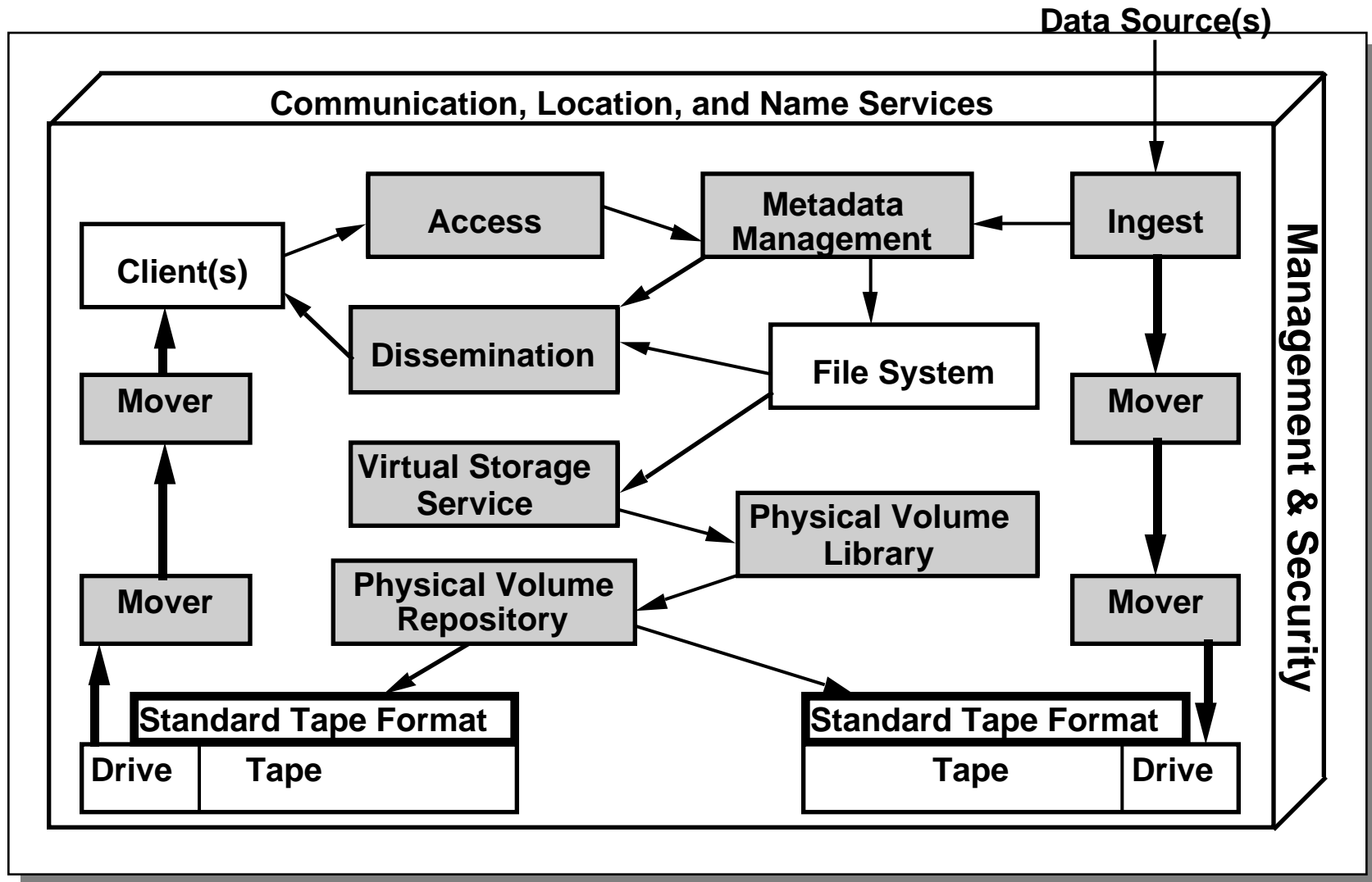
Tape Format Standard Goals

- **Ability to transfer tapes from one file management system to another seamlessly**
 - In case it is desirable to change file management systems
 - In case tapes are transferred from one facility to another
 - In either case, to avoid making additional copies of the tapes in question
- **High-level format which encompasses many physical formats**
- **File-level metadata on the tape itself**
- **Support multi-reel files and striped files**
- **Ability to reconstruct the file system just from reading the tapes, if it turned out to be necessary**

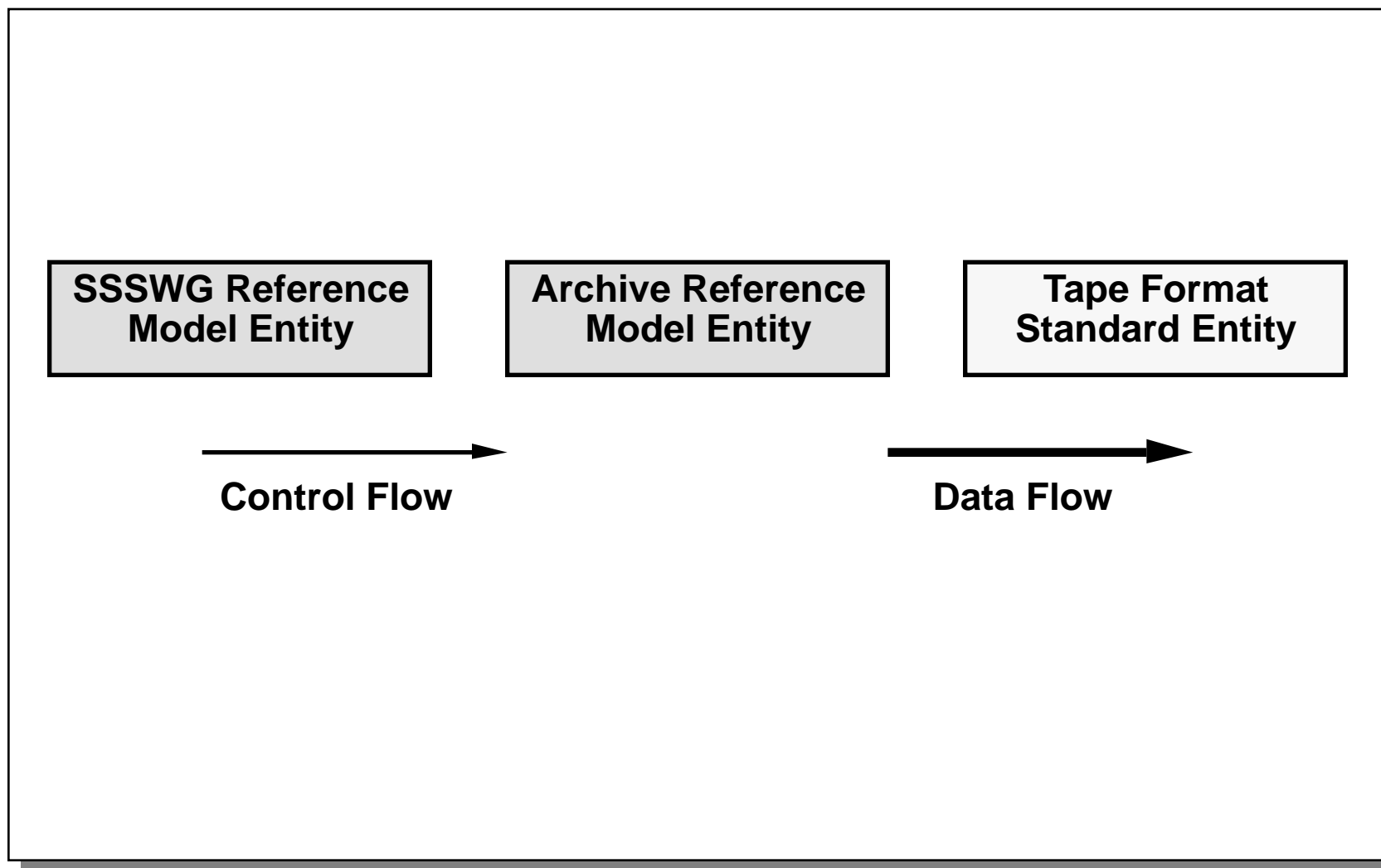
Tape Layout of Proposed Standard



How Does it all Fit Together?



Key to Previous Chart



Status and Future Work

- **At meeting last week in Los Angeles, the IEEE SSSWG developed a partial draft of the PVL API**
 - **Will be available for comment shortly**
 - **Will be translated into HTML also**
 - **<http://www.arl.mil/IEEE/ssswg.html>**
- **Meeting of IEEE SSSWG in January should vote on this API, and then send it forward**
- **Next archiving workshop December 19-20**
- **Presentation of the tape format standard proposal to the X3B5 committee November 28-29, in an attempt to gain sponsorship**